The Complexity of Computing. By JOHN E. SAVAGE. Wiley, New York, 1976. $22.95.

The Complexity of Computing by John E. Savage deals with the areas of measuring the complexity of problems and analyzing the resources needed to compute a function of a given complexity using a general purpose computer. The results are stated as inequalities which express tradeoffs between space and time. The topics covered are switching theory, sequential machines (including Turing Machines and RAM's), computer architecture and the analysis of algorithms.

This book may be an acceptable text for an advanced switching theory course, since it views the complexity of the process of computing in terms of the complexity of the circuitry required to do the computing. However, it is not suitable as a text for a more general course concerned with the complexity of the computing process, since certain fundamental topics are not covered. The chapter on Turing machines, for example, omits classic results about time and tape bounds for Turing machines. The chapter on analyzing algorithms overlooks the fact that several different cost criteria can be used to measure the complexity of an algorithm (one can talk about uniform or logarithmic time or space complexity, for example). No mention is made of asymptotic bounds or recurrence equations for determining the complexity of an algorithm.

While the book is weak in analyzing the complexity of the process of computing, it is far weaker in its analysis of what is being computed. For example, computational complexity measures and complexity classes are not mentioned. Also missing are known results about the complexity of computing partial recursive functions.

Savage's text is dominated by a hardware approach to complexity. As such, it differs from the traditional approach to complexity (e.g. *Theory of Computation* by Brainerd and Landweber, or "An Overview of the Theory of Computational Complexity" by Hartmanis and Hopcroft in JACM, July 1971). While we agree with the author that every computer scientist should be exposed to results concerning the complexity of what is being computed and how it is computed, we feel that this text, with its limited perspective, falls far short of that goal.

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